

Crew Perspectives From Neurolab

Neurolab had a crew of nine, seven flight crew in orbit and two alternate payload specialists who served in the payload operations and control center during the flight. All the crewmembers were involved in shaping a complex scientific payload into a set of workable procedures that could be done in space. This process gave them a unique perspective on the mission as a whole.



STS-90 crewmembers (front row, left to right) Alternate Payload Specialist Alexander (Alex) W. Dunlap, Pilot Scott D. Altman, Commander Richard A. Searfoss, Alternate Payload Specialist Chiaki Mukai; (back row) Payload Specialist James (Jim) A. Pawelczyk, Mission Specialist Richard (Rick) M. Linnehan, Mission Specialist Kathryn (Kay) P. Hire, Mission Specialist Dafydd (Dave) Rhys Williams, Payload Specialist Jay C. Buckey, Jr.

Commander Rick Searfoss summarizes his impressions of the Neurolab mission in this way:

“Neurolab represents the absolute pinnacle in melding rigorous, detailed scientific investigation with the unique, unforgiving, and ever-present operational demands of human spaceflight. Building on the lessons of 15 previous Spacelab module missions and having very specialized and focused scientific objectives produced outstanding success with the most complex space research mission ever flown. Now, four years after I had the great privilege of leading the flight crew as we worked, trained, and flew the mission, I stand even more in awe of what the entire team—contractors, investigators, NASA life sciences and mission operations personnel, and flight crew—accomplished with this flight.

Early in my astronaut career, a very wise man taught me that the commander sets the tone and the essence of his job is to “work the matrix of relationships between all the crew members.” Success in that endeavor invariably leads to mission success. I took that lesson to heart and tried to apply it every single day as launch drew closer and we finally flew. Further, with an undertaking as intricate as the Neurolab mission that philosophy has to be expanded to the “nth” power, where n is the number of different groups with very diverse backgrounds and perspectives, all of whom are crucial to a productive mission. I think virtually everyone on the whole team lived that philosophy and contributed to a marvelous sense of unity. After four years details fade, but what remains as strong as ever in my memory is the incredible human synergy of hundreds of dedicated people who made Neurolab work. And, from a very broad perspective, I really think that is what human space exploration is about, not the high-tech hardware, nor the fancy flying, nor even, really, the payloads, but the ability to pull together in the quest to do things never done before. And in that sense, there has never been a more superlative human space mission than Neurolab since we started this whole wonderful business of flying people to space 40 years ago.”

Payload Commander Rick Linnehan echoes the importance of teamwork and good working relationships among the crew in the success of this complex mission:

“My most vivid memories of the Neurolab mission are the ones involving the crew and the interpersonal relationships during training, flight, and even postflight. We all got along and worked so well together, even though there were grueling training and inflight schedules to adhere to and the associated stress that was inevitable. I consider everyone on that flight a very good friend. STS-90 was one of the most important scientific missions that NASA has ever flown. The inflight experiments that we conducted, and were a part of, were first-class science, and the information that was gathered will significantly contribute to the understanding of many physiologic and disease processes that occur in Earth’s populations. These

data will also contribute to future spaceflight initiatives involving long-duration flights and, someday, planetary exploration. I am proud to have been a member of the Neurolab team.”

Pilot Scott Altman also emphasizes the cooperative nature of the flight. Although he was mainly responsible for the operating the Shuttle and Spacelab systems, he also participated in the scientific payload:

“I was proud to be a part of such a scientifically ambitious effort that coordinated so many investigators and experiments from around the world into one mission. The entire team seemed to work together seamlessly as we planned the experiments and trained for the flight. I really enjoyed participating in the ball catch experiment and supporting all the scientific work by trying to fulfill the photographic and television documentation requirements for each experiment. I also have the claim to being responsible for more living organisms than any other crewmember—over 1500 crickets! I can report that they did well in zero-G and there was no chirping keeping us awake nights.

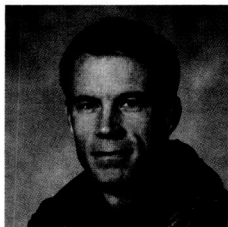
Neurolab was an incredible experience—both in space and on the ground. I was truly honored to be a part of it.”

Crew involvement was critical to Neurolab. Some members of the crew began training on the mission almost two years before the flight began. Throughout the preflight period the crew was involved in refining procedures, developing equipment, and testing protocols. During the flight, the crew served both as operators and as subjects for the experiments inflight and as communicators and problem solvers on the ground. The result of this effort was that the science that could be done on Neurolab was at the level of what could be done in a laboratory on the ground.

Alternate Payload Specialist Chiaki Mukai notes:

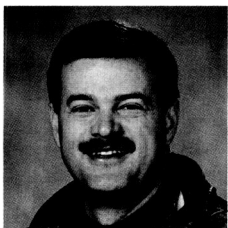
“It was truly a fortunate opportunity for me to be a part of the Neurolab mission—the last Spacelab mission conducted in the golden age of the Space Shuttle Program for science utilization. It was one of the most comprehensive science missions ever conducted with various difficult techniques and procedures. The mission included recording microneurograms, using the virtual environment generator head-mounted display, riding in the off-axis rotator, recording from neurons in the rodent hippocampus, performing several surgical techniques (including the survival surgery on the rodents), and so on. The mission demonstrated how capable the Spacelab was by carrying out those techniques and procedures in a same manner we do in the laboratories on the ground. I believe the mission served as a role model for a multiuser science facility such as International Space Station (ISS). I hope the ISS will be completed soon and become mature enough to support the same kinds of challenging experiments as the Neurolab mission did.”

The crew of the Neurolab mission included:



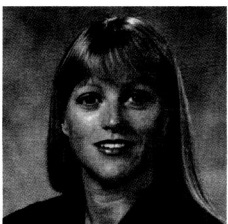
Commander Richard A. Searfoss, Col, USAF, ret. Col. Searfoss became an astronaut in 1991. He holds a B.S. in aeronautical engineering with honors from the USAF Academy and an M.S. in aeronautics from the California Institute of Technology. He is also a Distinguished Graduate of the USAF

Fighter Weapons School; was named Tactical Air Command F-111 Instructor Pilot of the Year in 1985; and has received the USAF Commendation, Meritorious Service, Defense Superior Service, and Defense Meritorious Service Medals.



Pilot Scott D. Altman, a commander in the U.S. Navy, became an astronaut candidate in December 1994. Commander Altman holds a B.S. degree in aeronautical and astronautical engineering from the University of Illinois and an M.S. in aeronautical engineering from the Naval Postgraduate

School. His honors include Distinguished Graduate of the USN Test Pilot School, Association of Naval Aviation 1987 Awardee for Outstanding Achievement in Tactical Aviation, and Navy Achievement and Commendation Medals.



Mission Specialist Kathryn (Kay) P. Hire, was the flight engineer for STS-90. A 1981 graduate of the U.S. Naval Academy, she earned her Naval Flight Officer wings then flew worldwide oceanographic research missions on board specially configured P-3 aircraft. She also completed an M.S. in

space technology at Florida Institute of Technology. In 1993, she became the first female in the U.S. assigned to a combat aircrew when she reported for duty with Patrol Squadron Sixty-Two (VP-62).



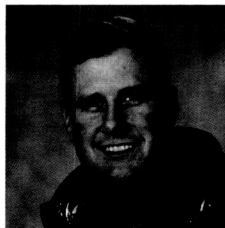
Mission Specialist Richard (Rick) M. Linnehan, a veterinarian, was the payload commander for Neurolab. Dr. Linnehan earned a B.S. degree in animal sciences from the University of New Hampshire and a D.V.M. from Ohio State University College of Veterinary Medicine. He completed an

internship in zoo animal medicine and comparative pathology at the Baltimore Zoo and Johns Hopkins University. NASA selected him as an astronaut in 1992.



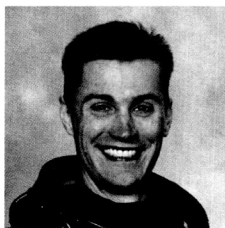
Mission Specialist Dafydd (Dave) Rhys Williams, a medical doctor and Canadian Space Agency (CSA) astronaut, was selected as an astronaut in 1995. Dr. Williams' credentials include an M.S. in physiology; an M.D. and a Master of Surgery from McGill University, Montreal; two res-

idencies—one in family practice from the University of Ottawa and the other in emergency medicine from the University of Toronto—and a fellowship in emergency medicine from the Royal College of Physicians and Surgeons of Canada. He was the head of life sciences at NASA-Johnson Space Center from 1998–2002.



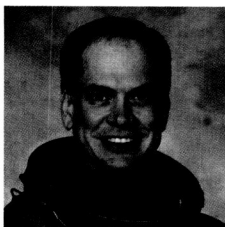
Payload Specialist Jay C. Buckey, Jr., a research associate professor of medicine at Dartmouth Medical School, received a B.S. in electrical engineering at Cornell University and an M.D. at Cornell University Medical College. Dr. Buckey completed his internship in internal medicine at The New York

Hospital-Cornell Medical Center and his medicine residency at the Dartmouth-Hitchcock Medical Center. He began his space career as a NASA Space Biology Research Fellow at the University of Texas Southwestern Medical Center.



Payload Specialist James (Jim) A. Pawelczyk, an associate professor of physiology at Penn State University, holds B.A. degrees in biology and psychology from the University of Rochester, an M.S. in physiology from Penn State University, and a Ph.D. in biology from the University of North

Texas. He completed a postdoctoral fellowship in cardiovascular neurophysiology at the University of Texas Southwestern Medical Center.



Alternate Payload Specialist Alexander (Alex) W. Dunlap, a veterinarian and medical doctor, holds a B.S. degree (cum laude) in zoology and animal science from the University of Arkansas, a D.V.M. from Louisiana State University School of Veterinary Medicine, and an M.D. from the

University of Tennessee College of Medicine.



Alternate Payload Specialist Chiaki Mukai, an astronaut for the National Space Development Agency of Japan (NASDA), holds an M.D. and a Ph.D. degree in physiology from Keio University School of Medicine, Japan, and is board-certified as a cardiovascular surgeon by the Japan Surgical

Society. A NASDA astronaut since 1985, she has flown in space on the STS-65 and STS-95 missions.